IXYS

Advance Technical Information

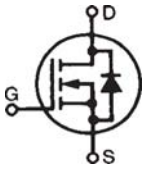
Polar3™ High Voltage Power MOSFET

IXTF2N300P3

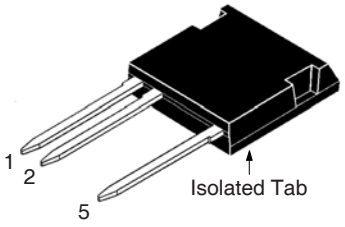
V_{DSS} = 3000V
I_{D25} = 1.60A
$R_{DS(on)}$ ≤ 21Ω

(Electrically Isolated Tab)

N-Channel Enhancement Mode



ISOPLUS i4-Pak™



1 = Gate 5 = Drain
2 = Source

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	3000	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	3000	V
V_{GSS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C	1.60	A
I_{D110}	T_C = 110°C	0.90	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	6.00	A
P_D	T_C = 25°C	160	W
T_J		- 55 ... +150	°C
T_{JM}		150	°C
T_{stg}		- 55 ... +150	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	Plastic Body for 10s	260	°C
F_C	Mounting Force	20..120 / 4.5..27	N/lb
V_{ISOL}	50/60Hz, 1 Minute	3000	V~
Weight		6	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 250μA	3000			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250μA	3.0		5.0	V
I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS} = 0V			10	μA
	Note 2, T_J = 125°C			500	μA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 1A, Note 1			21	Ω

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 3000V~ Electrical Isolation
- High Blocking Voltage
- High Voltage Package

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- High Voltage Power Supplies
- Capacitor Discharge Applications
- Pulse Circuits
- Laser and X-Ray Generation Systems

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 50V, I_D = 1A, Note 1	1.8	3.0		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		1890		pF
C_{oss}			90		pF
C_{rss}			42		pF
R_{Gi}	Gate Input Resistance		7.7		Ω
$t_{d(on)}$	**Resistive Switching Times**		21		ns
t_r	V_{GS} = 10V, V_{DS} = 500V, I_D = 1A		17		ns
$t_{d(off)}$	R_G = 5Ω (External)		69		ns
t_f			62		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 1.5kV, I_D = 1A		73		nC
Q_{gs}			9		nC
Q_{gd}			40		nC
R_{thJC}				0.77	°C/W
R_{thCS}			0.15		°C/W

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0V			2.0	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			8.0	A
V_{SD}	$I_F = I_S$, V_{GS} = 0V, Note 1			1.5	V
t_{rr}	I_F = 1A, -di/dt = 100A/μs		400		ns
Q_{RM}	V_R = 100V, V_{GS} = 0V		250		nC
I_{RM}			1.3		A

Notes:

1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.
2. Device must be heatsunk for high-temperature leakage current measurements to avoid thermal runaway.

ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

Fig. 1. Output Characteristics @ T_J = 25ºC

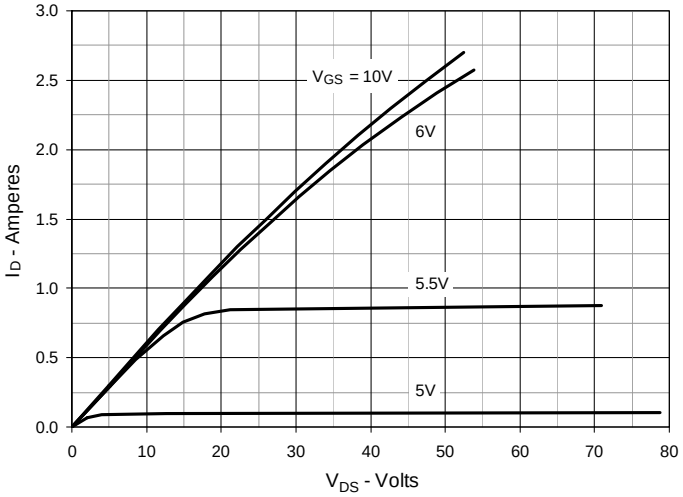


Fig. 2. Output Characteristics @ T_J = 125ºC

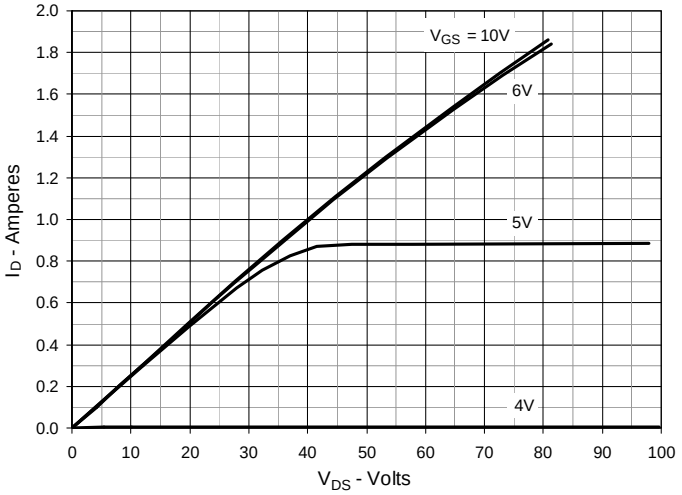


Fig. 3. $R_{DS(on)}$ Normalized to I_D = 1A Value vs. Junction Temperature

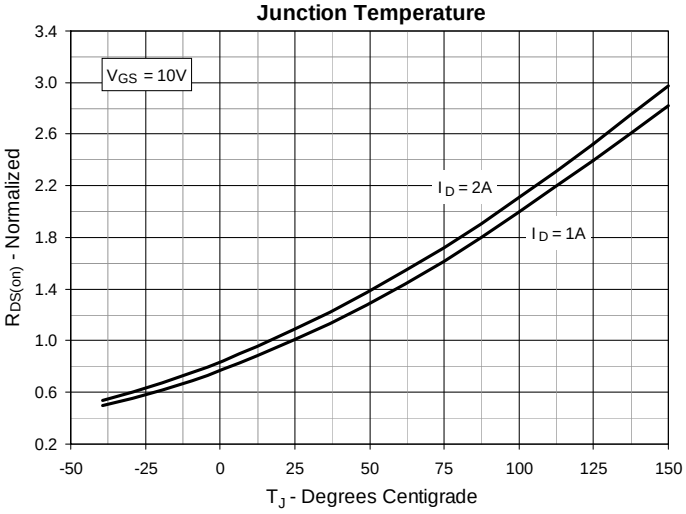


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 1A Value vs. Drain Current

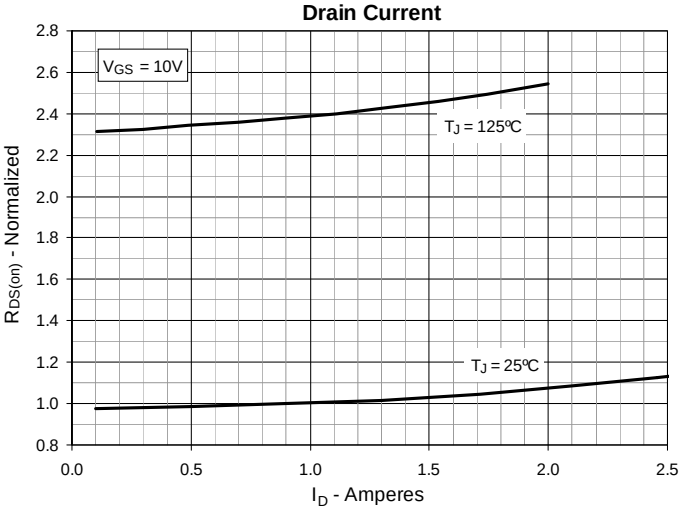


Fig. 5. Maximum Drain Current vs. Case Temperature

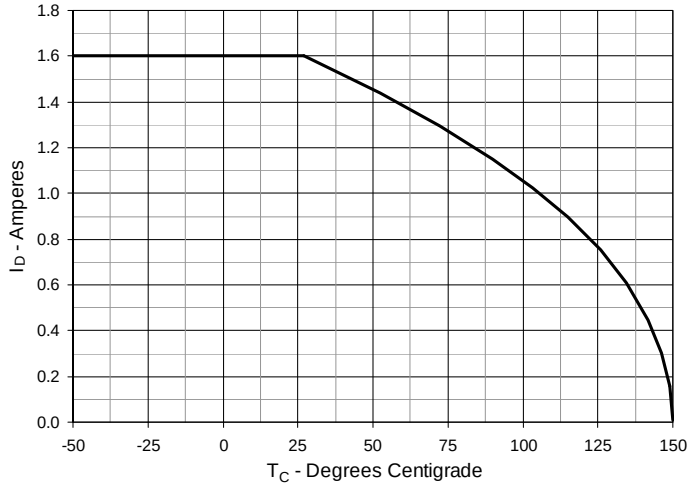


Fig. 6. Input Admittance

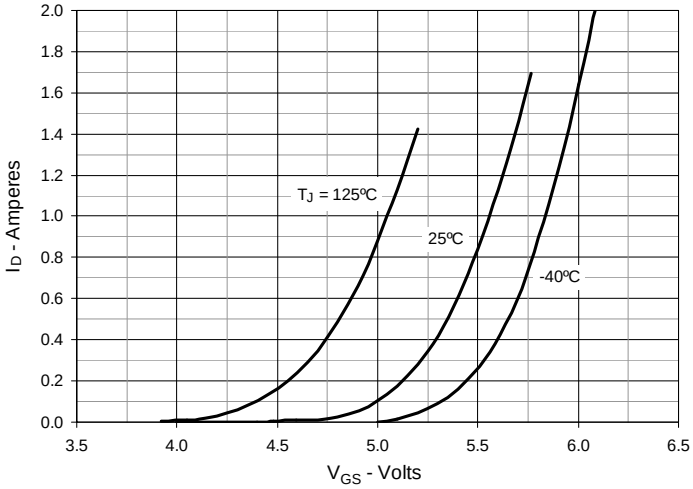


Fig. 7. Transconductance

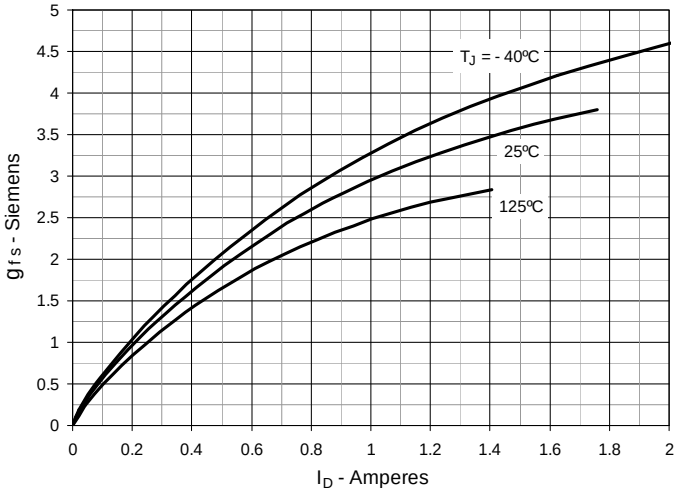


Fig. 8. Forward Voltage Drop of Intrinsic Diode

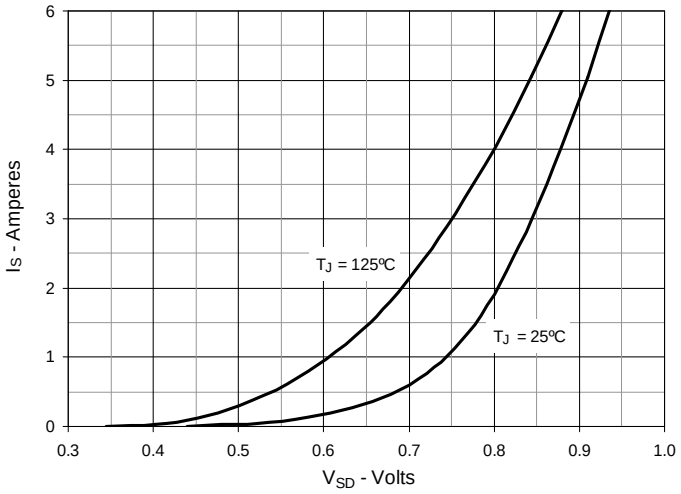


Fig. 9. Gate Charge

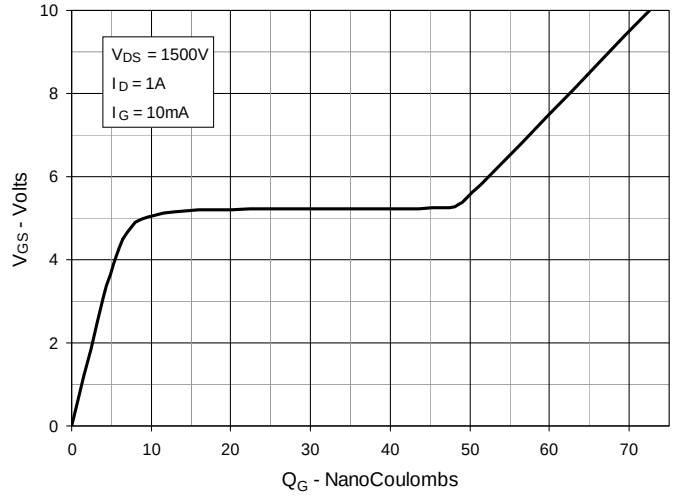


Fig. 10. Capacitance

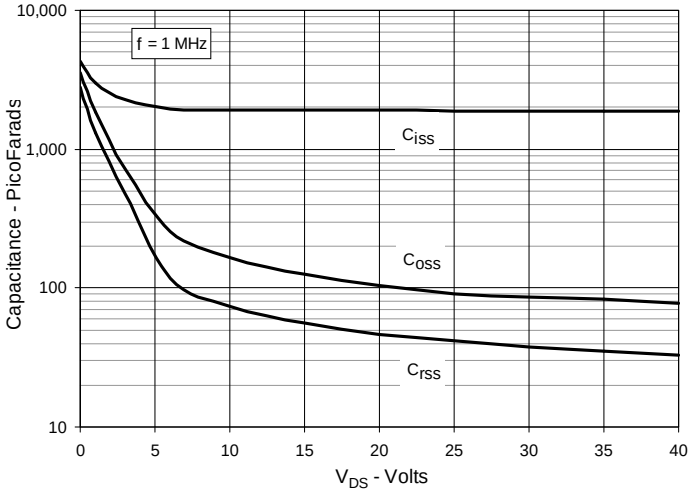


Fig. 11. Forward-Bias Safe Operating Area

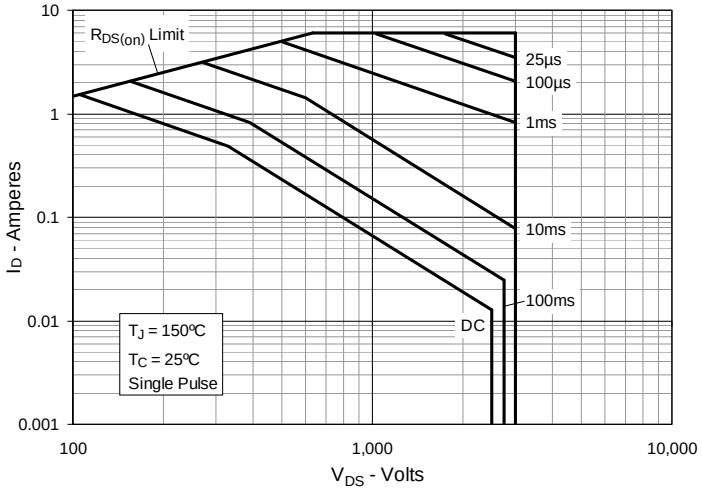
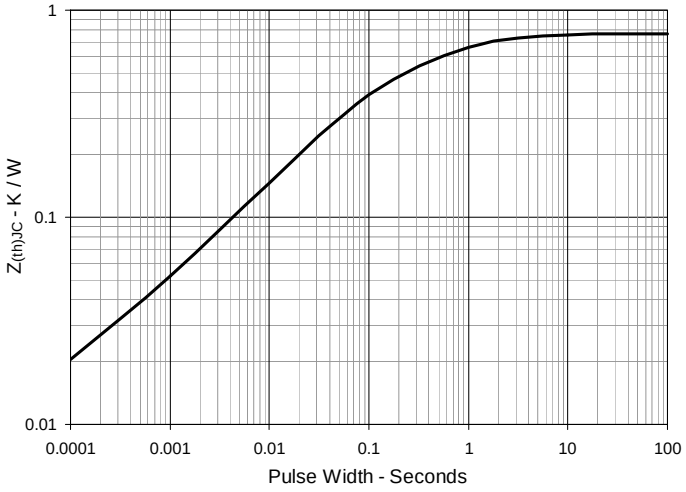
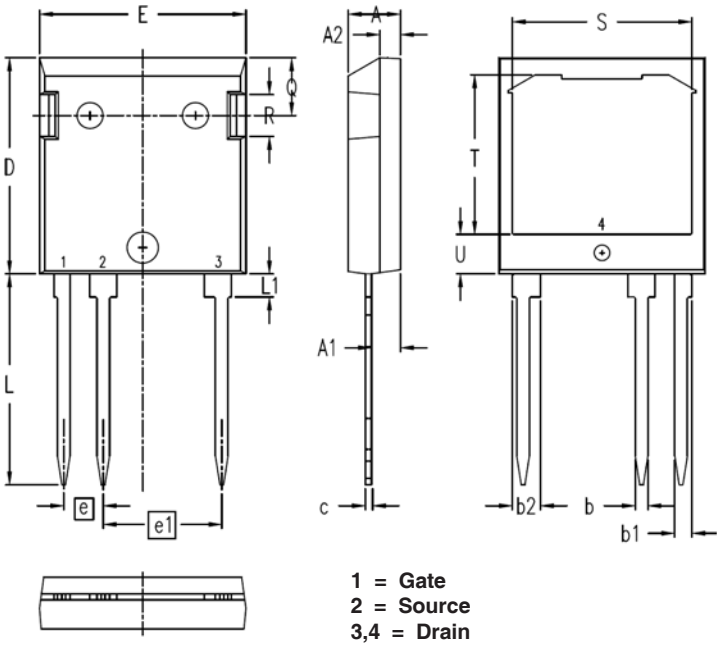


Fig. 12. Maximum Transient Thermal Impedance



ISOPLUS i4-Pak Outline



1 = Gate
2 = Source
3,4 = Drain

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.075	.083	1.90	2.10
b	.047	.055	1.20	1.40
b1	.061	.069	1.55	1.75
b2	.087	.094	2.20	2.40
c	.020	.029	0.51	0.74
D	.819	.846	20.80	21.50
E	.768	.799	19.50	20.30
e	.150 BSC		3.81 BSC	
e1	.450 BSC		11.43 BSC	
L	.780	.838	19.80	21.30
L1	.083	.094	2.10	2.40
Q	.213	.236	5.40	6.00
R	.157	.169	4.00	4.30
S	.673	.685	17.10	17.40
T	.602	.614	15.30	15.60
U	.142	.154	3.60	3.90